CLAIMS

What is claimed is:

1 1.   An apparatus comprising:

2   classifier logic to programmably extract key data from a data packet of a data

3 stream based upon a dynamically programmable offset, compare said key data with

4 one or more lookup tables of key entries, and store the result of said comparison as

5 at least part of a categorization vector; and

6   filter logic coupled to the classifier logic to receive said categorization vector

7 and to programmably determine group membership of said data packet based at

8 least in part upon said categorization vector, and to dynamically determine a

9 disposition for said data packet based at least in part upon said group membership.

1 2.   The apparatus of claim 1, wherein each of said one or more key entries is

2 unique.

1 3.   The apparatus of claim 1, wherein said filter logic comprises cascaded logic

2 representing N priority encoded filters and a default filter to determine said group

3 membership.

1 4.   The apparatus of claim 3, wherein said one or more lookup tables comprises

2 N content addressable memories.

1   5.   The apparatus of claim 3, wherein each of said priority encoded filters

2   comprises function logic to specify at least one combinational operation to apply to

3   the categorization vector, and action logic to dictate an action for said data packet

4   based at least in part upon the outcome of said at least one combinational operation.

1   6   The apparatus of claim 5, wherein said function logic further comprises logic

2   to store programmable value data, logic to store programmable mask data, and logic

3   to perform one or more comparisons between said categorization vector and at least

4   one of said programmable value data and said programmable mask data.

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1   7   The apparatus of claim 5, wherein one or more of said priority encoded filters

2   further comprises polarity logic to determine whether said action is to be dictated

3   based upon the outcome of said one or more comparisons resulting in a match

4   condition, or whether said action is specified based upon the outcome of said one or

5   more comparisons resulting in a miss condition.

1   8.   The apparatus of claim 5, wherein said combinational logic performs a

2   masked-AND operation.

1   9.   The apparatus of claim 5, wherein said combinational logic performs a

2   masked-GOR operation.

1   10.   The apparatus of claim 5, wherein said default filter comprises default action

2   logic for determining the disposition of said data packet if said action logic of said

3   priority encoded filters does not dictate an action.

1   11.   The apparatus of claim 10, wherein said plurality of filter actions include a

2   packet drop action, a packet divert action, and a packet pass action.

1   12.   The apparatus of claim 11, wherein if said drop action is specified, said data

2   packet is dropped from said data stream.

1   13.   The apparatus of claim 11, wherein if said divert action is specified, said data

2   packet is diverted from said data stream to a host processor for processing.

1   14.   The apparatus of claim 11, wherein if said pass action is specified, said data

2   packet is passed through said priority encoded filter as part of an output data

3   stream.

1   15.   The apparatus of claim 1, wherein said filter logic further determines a priority

2   for said packet based at least in part upon said categorization vector.

1   16.   A method comprising:

2   extracting key data from a data packet of a data stream based at least in

3   part upon a dynamically programmable offset,

4   comparing said key data with one or more lookup tables of key entries,

5   and storing the result of said comparison as at least part of a categorization

6   vector;

7   determining group membership of said data packet based at least in part

8   upon said categorization vector, and

9   dynamically determining a disposition for said data packet based at least

10   in part upon said group membership.

1   17.   The method of claim 16, wherein each of said one or more key entries is

2   unique.

1   18.   The method of claim 16, wherein group membership of said data packet is

2   dynamically determined by performing one or more comparisons of said

3   categorization vector against one or more dynamically programmable Boolean

4   values.

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1   19.   The method of claim 18, wherein said one or more comparisons

2   comprises performing one or more Boolean operations.

1   20.   The method of claim 19, wherein said Boolean operations comprise at

2   least one of a masked-AND and a masked-GOR operation.

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1   21.   The method of claim 18, wherein said disposition comprises at least one

2   of a packet drop action, a packet divert action, and a packet pass action.

1   22.   The method of claim 21, further comprising determining whether said

2   disposition is to be performed based upon the outcome of said one or more

3   comparisons resulting in a match condition, or whether said disposition is to be

4   performed based upon the outcome of said one or more comparisons resulting in

5   a miss condition.

1   23.   The method of claim 16, further comprising:

2   determining a priority of said data packet based at least in part upon said

3   categorization vector.

1   24.   A method comprising:

2   receiving a multi-bit categorization vector representation of a data packet,

3   said categorization vector identifying membership of said data packet in one or

4   more classes of data and one or more subclasses of data;

5   performing one or more combinatorial operations on said categorization

6   vector to determine whether said data packet satisfies one or more established

7   membership criteria; and

8   disposing of said data packet based at least in part upon whether said

9   data packet satisfies said established membership criteria.

1   25.   The method of claim 24, wherein said data packet may be disposed at

2   least through a packet drop action, a packet divert action, and a packet pass

3   action.

1   26.   The method of claim 24, wherein determining whether said data packet

2   satisfies one or more established membership criteria comprises performing one

3   or more comparisons of said categorization vector against one or more

4   dynamically programmable Boolean values.

1   27.   The method of claim 22, wherein said categorization vector further

2   identifies a priority membership of said data packet relative to one or more

3   additional packets.